

Remarks

Claims 1 - 2 are pending, and claims 3-18 were cancelled in applicants' previous responses. Claim 1 has been amended and new claims 19 - 28 have been added. Basis for the amendments and new claims is in the specification at least in the following places: page 8, lines 30-32, p. 13, first paragraph, and lines 20-26, p. 15, ll. 10 -19, p.16, ll. 22-25, Figure 18, p. 18, ll. 9-24, p. 24, ll. 16-19, p. 28, l. 32, p. 29, l. 3, and ll. 6-9, p. 30, ll. 22-25, p. 33, ll. 19 - p.34, l. 8, and Example 5. Basis for the recitation of an absence of pairs of rolls forming a nip through which the substrate passes in claims 1 and 26 is found in the fact that every description and drawing of an improvement station in the application has no such pairs of rolls (nip rolls), see: p. 8, ll. 30-32, p. 10, l. 21, p. 11, l. 4, Figure 11, p. 13, first paragraph – page 14, l. 13, Fig. 16, p. 14, ll. 3-7, Fig. 17, p. 16, l. 8 – p. 17, l. 20, Fig. 18, p. 18, first paragraph, p. 28, l. 30 – p. 30, l. 8, and the examples.

Claims 1 and 2 stand rejected under 35 USC § 102(b) as being anticipated by Schlunke U.S. Patent 4,924,772. This rejection has been avoided by the amendment to claim 1 and the new claims.

As the Examiner has stated (Office Action p. 2) Schlunke teaches a calender treatment station comprising a train of three or more pivotable rolls. As the claims are now amended, there are material differences between the claims of the present application and Schlunke.

1. Claim 1 now requires that at least 2 of the pick-and-place rolls rotate at different speeds; whereas rolls 18-20 cited by the Examiner would be driven by the paper travelling through the calender at the same speed.
2. All the claims require that the pick-and-place rolls contact the wet coating at positions relative to a first position along the substrate that are not the same or integer multiples of one another. Such a requirement is not disclosed in Schlunke. Nothing is said in Schlunke about the distance relationship between guide rolls 20 and 19 and guide rolls 19 and 18.
3. All the claims require an absence of pairs of rolls forming a nip through which the substrate passes. Schlunke is a calender apparatus having 4 nips formed by pairs of rolls through which his paper or textile web (column 4, lines 58-60) passes.
4. New claim 26 requires that at least two of the pick-and-place rolls have different diameters from each other; while, there is no disclosure in Schlunke of guide rollers 18-20 having different diameters.

5. New claims 24 and 27 require thickness measuring devices connected to a controller that controls the speed of the pick-and-place rolls; which is not disclosed in Schlunke.

In view of the above differences, the amended claim set is novel over Schlunke.

Claims 1 and 2 stands rejected under 35 USC § 103(a) as being unpatentable over Cheatham U.S. Patent 2,053,601 in view of Gilman U.S. Patent 1,583,788. This rejection has been avoided by the claim amendments.

While the Examiner has correctly noted that Cheatham teaches a smoothing station (for making coated paper), there are substantial differences between the amended claims and the combination of Cheatham and Gilman.

1. Claim 1, as amended, requires that at least two of the pick-and-place rolls rotate at different speeds; whereas, Cheatham's smoothing rolls 15-20 all rotate at the same speed, since they are driven by the same drive means.
2. All the claims, as amended, require that the pick-and-place rolls contact the wet coating at a first position on the substrate and re-contact the wet coating at positions on the substrate the lengths of which (with respect to the first position) are not the same nor integer multiples of one another; whereas, there is no disclosure of such a requirement in Cheatham. In Cheatham's Fig. 1, the distance between smoothing rolls 15-20 appears to be equal, and all are driven by the same drive means at the same speed (p. 4, col. 1, ll. 2-17 and Figs 1 and 3).
3. New claim 26 requires that at least two pick-and-place rolls have different diameters. The Examiner has relied on Gilman for a teaching of smoothing station rollers of different sizes (Office Action p. 4). Although Gilman Fig. 1 shows a smoothing machine (items 3-6) and that figure indicates rollers of different diameters, it does not make the use of different sized pick-and-place rollers in the apparatus of Cheatham obvious. In Gilman, the paper web 7 passes through a dryer 2 before passing through the smoothing station. Gilman states (Col. 1, ll. 46-50) that, "the coating approximates but has not reached the setting point." In his Figure, the rollers (4 and 5) that touch the coated side of the paper are shown as the same size, except for brushes 6 which appear slightly larger than guide rollers 4 and 5. Since Gilman's coating is dry by the time it reaches guide rollers 4 and 5, they can not be characterized as pick-and-place devices. Gilman states (col. 1, l. 52 – col. 2, l. 72) that smoothing is accomplished by the brushes 6, "so that no material amount is removed by this treatment." Therefore, the brushes 6 in Gilman are not pick-and-place devices, since they

admittedly do not pick up any of the coating from the paper substrate. In addition, all the present claims now require that the pick-and-place rolls have contiguous contacting surfaces (e.g., like a metal roller) which eliminates brushes as a possibility (since the surface presented by the bristle ends of a brush is not contiguous). Also, Gilman's brushes 6 act on the paper web 7 while it is supported by cylinder 3 (p. 1, ll. 55-58); whereas, there is no opposed supporting roll cooperating with the pick-and-place rolls of the amended claims.

The dependent claims are even more distinct from Cheatham and Gilman because neither patent discloses the: sinusoidal speed differential of claim 21; speed differential between the substrate and at least one pick-and-place roll having opposite signs for a portion of time as in claim 22; speed differential between the substrate and at least two of the pick-and-place rolls being periodic and out of phase with one another as in claim 20; the thickness measuring devices and controller of claims 24 and 27; or the downstream drying or curing apparatus of claims 25 and 28.

In view of the distinctions recited above between the amended claim set and Cheatham and Gilman, the amended claims are nonobvious in view of these patents.

Claim 1 has been rejected under 35 U.S.C. 103(a) as obvious over Hall British Patent 1,278,099 in view of Gilman. This rejection has been avoided by the claim amendments.

The Examiner has correctly noted that Hall teaches an apparatus for smoothing a liquid coating on a substrate. Nevertheless, there are significant differences separating the combination of Hall and Gilman from the present claims:

1. As was the case with Cheatham, Hall does not disclose at least two pick-and-place rolls rotating at different speeds. Hall's rollers 3 are all driven by a gear mechanism (p.2, l. 127 – p. 3, l. 2).
2. Also, as was the case with Cheatham, Hall does not have the feature of pick-and-place rolls re-contacting the substrate at positions that are not equal nor integer multiples of one another. The center-to-center distances of Hall's rollers 3 are the same (p. 2, ll. 98-100). The Examiner has acknowledged this at Office Action p. 5, but stated that, "one of ordinary skill in the art would expect that the contacting distances of lengths would be different because the devices are translated or moved into/out of phase with one another such that the devices are not periodically related along the direction of travel of the substrate." This is a reference to Hall Figs. 3 and 4 and his text at p. 3, ll. 19-34, which describes vibration of rollers 3 (brought about by rapid axial reciprocation of the rollers, p. 3, ll. 19 - 27); however, it does not describe any change in linear

spacing of rollers 3 along the length of the moving paper web. The movement into/out of phase is an axial movement of the rollers by a cam shaft, not a movement up or down-web. Rollers 3 remain in a fixed relationship to each other down-web because they are driven by gears engaged with a gear drive (Hall p. 2, l. 127 – p. 3, l. 5), and the out-of-phase condition (Hall p. 2, ll. 48-55) refers to the reciprocation of Hall's at least three rollers relative to each other axially, not down-web. Because Hall's rollers 3 are made to reciprocate to and fro across the film 1 (p. 1, ll. 48 - 51) by a cam shaft (p. 2, ll. 113 – 127) the vibrations described at page 3 are necessarily limited by the mechanical tolerances of the mechanism driving rollers 3 and the properties of the materials of construction. Hall, himself, says (p. 3, l. 35) that Figures 3 and 4 only illustrate the vibrations "diagrammatically", and the actual magnitude of the vibrations is not described. There is no actual disclosure in Hall of pick-and-place devices re-contacting a substrate at positions the lengths of which are not equal nor integer multiples of one another.

3. As was the case of Cheatham with regard to new claim 26, Hall does not disclose pick-and-place rolls at least two of which have different diameters. As discussed above, Gilman does not provide basis for adding this feature to the primary reference. The facts that Hall's rollers 3 are all the same diameter, are all in-line, and are driven by a gear drive, would militate against substituting rollers of varying diameter into his stack of smoothing rollers.

The distinctions of the dependent claims (20-22, 24, 25, 27 and 28) mentioned above apply to the combination of Hall and Gilman as well.

Based on the differences pointed out above, the combination of Hall and Gilman to not make the amended claims obvious to one of ordinary skill. The skilled person would have to make significant modifications to Hall in order to have the invention of amended claim 1 and the new claims dependent therefrom, and reasons for such modifications are not provided by the prior art.

Claim 2 has been rejected under 35 U.S.C. 103(a) as obvious over Hall in view of Gilman and Cheatham. This rejection is avoided by the amended claim set, since claim 2 depends from amended claim 1. Although Cheatham discloses rotation of smoothing rolls 15-20 in the direction of substrate motion, differences numbers 1 and 2 recited above for the previous rejection still apply.

In light of the above discussion, claims 1,2, and 5-14 as presented are in condition for allowance. Withdrawal of the rejections under 35 U.S.C. 102 and 103 are requested, and a

notification of allowability is respectfully solicited. If any issues or questions remain, the Examiner is invited to contact the undersigned attorney at the telephone number noted below.

Respectfully submitted,

January 4, 2007

Date

By:

Douglas B. Little, Reg. No.: 28,439

Telephone No.: 651-733-1501

Office of Intellectual Property Counsel
3M Innovative Properties Company
Facsimile No.: 651-736-3833